

108TH CONGRESS  
2D SESSION

# H. R. 4218

To amend the High-Performance Computing Act of 1991.

---

## IN THE HOUSE OF REPRESENTATIVES

APRIL 27, 2004

Mrs. BIGGERT (for herself, Mr. DAVIS of Tennessee, Mr. BOEHLERT, and Mr. JOHNSON of Illinois) introduced the following bill; which was referred to the Committee on Science

---

## A BILL

To amend the High-Performance Computing Act of 1991.

1       *Be it enacted by the Senate and House of Representa-*  
2       *tives of the United States of America in Congress assembled,*

3       **SECTION 1. SHORT TITLE.**

4       This Act may be cited as the “High-Performance  
5       Computing Revitalization Act of 2004”.

6       **SEC. 2. DEFINITIONS.**

7       Section 4 of the High-Performance Computing Act  
8       of 1991 (15 U.S.C. 5503) is amended—

9               (1) in paragraph (2), by inserting “and multi-  
10       disciplinary teams of researchers” after “high-per-  
11       formance computing resources”;

1 (2) in paragraph (3)—

2 (A) by striking “scientific workstations,”;

3 (B) by striking “(including vector super-  
4 computers and large scale parallel systems)”;

5 (C) by striking “and applications” and in-  
6 serting “applications”; and

7 (D) by inserting “, and the management of  
8 large data sets” after “systems software”;

9 (3) in paragraph (4), by striking “packet  
10 switched”; and

11 (4) by amending paragraphs (5) and (6) to  
12 read as follows:

13 “(5) ‘Program’ means the High-Performance  
14 Computing Research and Development Program de-  
15 scribed in section 101; and

16 “(6) ‘Program Component Areas’ means the  
17 major subject areas under which are grouped related  
18 individual projects and activities carried out under  
19 the Program.”.

20 **SEC. 3. HIGH-PERFORMANCE COMPUTING RESEARCH AND**  
21 **DEVELOPMENT PROGRAM.**

22 Title I of the High-Performance Computing Act of  
23 1991 (15 U.S.C. 5511 et seq.) is amended—

24 (1) in the title heading, by striking “**AND**  
25 **THE NATIONAL RESEARCH AND EDU-**

**CATION NETWORK”** and inserting **“RE-  
SEARCH AND DEVELOPMENT”**;

(2) in section 101—

(A) the section heading, by striking **“NA-  
TIONAL HIGH-PERFORMANCE COM-  
PUTING”** and inserting **“HIGH-PERFORM-  
ANCE COMPUTING RESEARCH AND DEVEL-  
OPMENT”**;

(B) in subsection (a)—

(i) in the subsection heading, by strik-  
ing **“NATIONAL HIGH-PERFORMANCE  
COMPUTING”** and inserting **“HIGH-PER-  
FORMANCE COMPUTING RESEARCH AND  
DEVELOPMENT”**;

(ii) by striking paragraphs (1) and (2)  
and inserting the following: **“(1) The  
President shall implement a High-Perform-  
ance Computing Research and Develop-  
ment Program, which shall—**

**“(A) provide for long-term basic and ap-  
plied research on high-performance computing;**

**“(B) provide for research and development  
on, and demonstration of, technologies to ad-  
vance the capacity and capabilities of high-per-  
formance computing and networking systems;**

1           “(C) provide for sustained access by the  
2           research community in the United States to  
3           high-performance computing systems that are  
4           among the most advanced in the world in terms  
5           of performance in solving scientific and engi-  
6           neering problems, including provision for tech-  
7           nical support for users of such systems;

8           “(D) provide for efforts to increase soft-  
9           ware availability, productivity, capability, secu-  
10          rity, portability, and reliability;

11          “(E) provide for high-performance net-  
12          works, including experimental testbed networks,  
13          to enable research and development on, and  
14          demonstration of, advanced applications enabled  
15          by such networks;

16          “(F) provide for computational science and  
17          engineering research on mathematical modeling  
18          and algorithms for applications in all fields of  
19          science and engineering;

20          “(G) provide for the technical support of,  
21          and research and development on, high-per-  
22          formance computing systems and software re-  
23          quired to address Grand Challenges;

24          “(H) provide for educating and training  
25          additional undergraduate and graduate students

1 in software engineering, computer science, com-  
2 puter and network security, applied mathe-  
3 matics, library and information science, and  
4 computational science; and

5 “(I) provide for improving the security of  
6 computing and networking systems, including  
7 Federal systems, including research required to  
8 establish security standards and practices for  
9 these systems.”;

10 (iii) by redesignating paragraphs (3)  
11 and (4) as paragraphs (2) and (3), respec-  
12 tively;

13 (iv) in paragraph (2), as so redesign-  
14 ated by clause (iii) of this subpara-  
15 graph—

16 (I) by striking subparagraph (B);

17 (II) by redesignating subpara-  
18 graphs (A) and (C) as subparagraphs  
19 (D) and (F), respectively;

20 (III) by inserting before subpara-  
21 graph (D), as so redesignated by sub-  
22 clause (II) of this clause, the following  
23 new subparagraphs:

1           “(A) establish the goals and priorities for Fed-  
2       eral high-performance computing research, develop-  
3       ment, networking, and other activities;

4           “(B) establish Program Component Areas that  
5       implement the goals established under subparagraph  
6       (A), and identify the Grand Challenges that the Pro-  
7       gram should address;

8           “(C) provide for interagency coordination of  
9       Federal high-performance computing research, devel-  
10      opment, networking, and other activities undertaken  
11      pursuant to the Program;”;

12                       (IV) by inserting after subparagraph  
13                       (D), as so redesignated by subclause (II)  
14                       of this clause, the following new subpara-  
15                       graph:

16           “(E) develop and maintain a research, develop-  
17      ment, and deployment roadmap for the provision of  
18      high-performance computing systems under para-  
19      graph (1)(C); and”;

20                       (v) in paragraph (3), as so redesign-  
21                       ated by clause (iii) of this subpara-  
22                       graph—

23                       (I) by striking “paragraph  
24                       (3)(A)” and inserting “paragraph  
25                       (2)(D)”;

1 (II) by amending subparagraph  
2 (A) to read as follows:

3 “(A) provide a detailed description of the Pro-  
4 gram Component Areas, including a description of  
5 any changes in the definition of or activities under  
6 the Program Component Areas from the preceding  
7 report, and the reasons for such changes, and a de-  
8 scription of Grand Challenges supported under the  
9 Program;”;

10 (III) in subparagraph (C), by  
11 striking “specific activities” and all  
12 that follows through “the Network”  
13 and inserting “each Program Compo-  
14 nent Area”;

15 (IV) in subparagraph (D), by in-  
16 serting “and for each Program Com-  
17 ponent Area” after “participating in  
18 the Program”;

19 (V) in subparagraph (D), by  
20 striking “applies;” and inserting “ap-  
21 plies; and”;

22 (VI) by striking subparagraph  
23 (E) and redesignating subparagraph  
24 (F) as subparagraph (E); and

1 (VII) in subparagraph (E), as so  
2 redesignated by subclause (VI) of this  
3 clause, by inserting “and the extent to  
4 which the Program incorporates the  
5 recommendations of the advisory com-  
6 mittee established under subsection  
7 (b)” after “for the Program”;

8 (C) in subsection (b)—

9 (i) by redesignating paragraphs (1)  
10 through (5) as subparagraphs (A) through  
11 (E), respectively;

12 (ii) by inserting “(1)” after “ADVI-  
13 SORY COMMITTEE.—”;

14 (iii) in paragraph (1)(C), as so redес-  
15 ignated by clauses (i) and (ii) of this sub-  
16 paragraph, by inserting “, including fund-  
17 ing levels for the Program Component  
18 Areas” after “of the Program”;

19 (iv) in paragraph (1)(D), as so redес-  
20 ignated by clauses (i) and (ii) of this sub-  
21 paragraph, by striking “computing” and  
22 inserting “high-performance computing  
23 and networking”; and

24 (v) by adding at the end the following  
25 new paragraph:

1       “(2) In addition to the duties outlined in paragraph  
 2 (1), the advisory committee shall conduct periodic evalua-  
 3 tions of the funding, management, coordination, imple-  
 4 mentation, and activities of the Program, and shall report  
 5 not less frequently than once every two fiscal years to the  
 6 Committee on Science of the House of Representatives  
 7 and the Committee on Commerce, Science, and Transpor-  
 8 tation of the Senate on its findings and recommendations.  
 9 The first report shall be due within one year after the date  
 10 of enactment of this paragraph.”; and

11               (D) in subsection (c)(1)(A), by striking  
 12               “Program or” and inserting “Program Compo-  
 13               nent Areas or”; and

14               (3) by striking sections 102 and 103.

15 **SEC. 4. AGENCY ACTIVITIES.**

16       Title II of the High-Performance Computing Act of  
 17 1991 (15 U.S.C. 5521 et seq.) is amended—

18               (1) by amending subsection (a) of section 201  
 19       to read as follows:

20       “(a) GENERAL RESPONSIBILITIES.—As part of the  
 21 Program described in title I, the National Science Foun-  
 22 dation shall—

23               “(1) support research and development to gen-  
 24       erate fundamental scientific and technical knowledge  
 25       with the potential of advancing high-performance

1 computing and networking systems and their appli-  
2 cations;

3 “(2) provide computing and networking infra-  
4 structure support to the research community in the  
5 United States, including the provision of high-per-  
6 formance computing systems that are among the  
7 most advanced in the world in terms of performance  
8 in solving scientific and engineering problems, and  
9 including support for advanced software and applica-  
10 tions development, for all science and engineering  
11 disciplines; and

12 “(3) support basic research and education in all  
13 aspects of high-performance computing and net-  
14 working.”;

15 (2) by amending subsection (a) of section 202  
16 to read as follows:

17 “(a) GENERAL RESPONSIBILITIES.—As part of the  
18 Program described in title I, the National Aeronautics and  
19 Space Administration shall conduct basic and applied re-  
20 search in high-performance computing and networking,  
21 with emphasis on—

22 “(1) computational fluid dynamics, computa-  
23 tional thermal dynamics, and computational aero-  
24 dynamics;

1           “(2) scientific data dissemination and tools to  
2           enable data to be fully analyzed and combined from  
3           multiple sources and sensors;

4           “(3) remote exploration and experimentation;  
5           and

6           “(4) tools for collaboration in system design,  
7           analysis, and testing.”;

8           (3) in section 203—

9                   (A) by striking subsections (a) through (d)  
10           and inserting the following:

11           “(a) GENERAL RESPONSIBILITIES.—As part of the  
12           Program described in title I, the Secretary of Energy  
13           shall—

14                   “(1) conduct and support basic and applied re-  
15           search in high-performance computing and net-  
16           working to support fundamental research in science  
17           and engineering disciplines related to energy applica-  
18           tions; and

19                   “(2) provide computing and networking infra-  
20           structure support, including the provision of high-  
21           performance computing systems that are among the  
22           most advanced in the world in terms of performance  
23           in solving scientific and engineering problems, and  
24           including support for advanced software and applica-

1        tions development, for science and engineering dis-  
2        ciplines related to energy applications.”; and

3                (B) by redesignating subsection (e) as sub-  
4        section (b);

5                (4) by amending subsection (a) of section 204  
6        to read as follows:

7        “(a) GENERAL RESPONSIBILITIES.—As part of the  
8        Program described in title I—

9                “(1) the National Institute of Standards and  
10       Technology shall—

11                “(A) conduct basic and applied metrology  
12       research needed to support high-performance  
13       computing and networking systems;

14                “(B) develop benchmark tests and stand-  
15       ards for high-performance computing and net-  
16       working systems and software;

17                “(C) develop and propose voluntary stand-  
18       ards and guidelines, and develop measurement  
19       techniques and test methods, for the interoper-  
20       ability of high-performance computing systems  
21       in networks and for common user interfaces to  
22       high-performance computing and networking  
23       systems; and

24                “(D) work with industry and others to de-  
25       velop, and facilitate the implementation of,

1 high-performance computing applications to  
2 solve science and engineering problems that are  
3 relevant to industry; and

4 “(2) the National Oceanic and Atmospheric Ad-  
5 ministration shall conduct basic and applied research  
6 on high-performance computing applications, with  
7 emphasis on—

8 “(A) improving weather forecasting and  
9 climate prediction;

10 “(B) collection, analysis, and dissemination  
11 of environmental information; and

12 “(C) development of more accurate models  
13 of the ocean-atmosphere system.”; and

14 (5) by amending subsection (a) of section 205  
15 to read as follows:

16 “(a) GENERAL RESPONSIBILITIES.—As part of the  
17 Program described in title I, the Environmental Protec-  
18 tion Agency shall conduct basic and applied research di-  
19 rected toward advancement and dissemination of computa-  
20 tional techniques and software tools for high-performance  
21 computing systems with an emphasis on modeling to—

22 “(1) develop robust decision support tools;

23 “(2) predict pollutant transport and the effects  
24 of pollutants on humans and on ecosystems; and

- 1 “(3) better understand atmospheric dynamics
- 2 and chemistry.”.

